

Digital sensors are revolutionising process measurement technology

WATER WASTEWATER

Michael Häck, Düsseldorf, HACH LANGE GmbH, Willstätterstraße 11, D-40549, Germany
Email: michael.haack@hach-lange.de

Introduction

Communication between sensors and controllers used to be based on analogue current and voltage signals. As these signals depend on the parameter to be measured, it was rarely possible to operate different sensors using just one controller.

Modern digital sensors, on the other hand, function completely self-sufficiently. They transmit the measured values digitally, together with the associated unit (e.g. 1.5 mg/l O₂), to the controller. The advantages are obvious; any desired combination of sensors can be connected to a single controller. This simplifies both operation and spare parts administration.

Moreover, digital communication between different controllers in a single network makes all measured values accessible at every one of the plant's measuring stations and enables them to be transmitted to a central control room.

This article introduces the HACH LANGE digital controller platform.

SC platform



The HACH LANGE SC platform consists of two controllers, namely the SC100 and the SC1000. Together with the digital sensors, they form a perfectly synchronised system into which conventional analogue instruments can also be integrated easily. All measured values are displayed on site

and can be transmitted optionally via a field bus or an analogue connection to higher level control systems. Integrated

Figure 1: SC100 Controller

controller functions such as two-point controllers, P, PI and PID controllers are preconfigured and can be parameterised on site, together with the connected sensors.



Figure 2: SC1000 Controller at an aeration tank

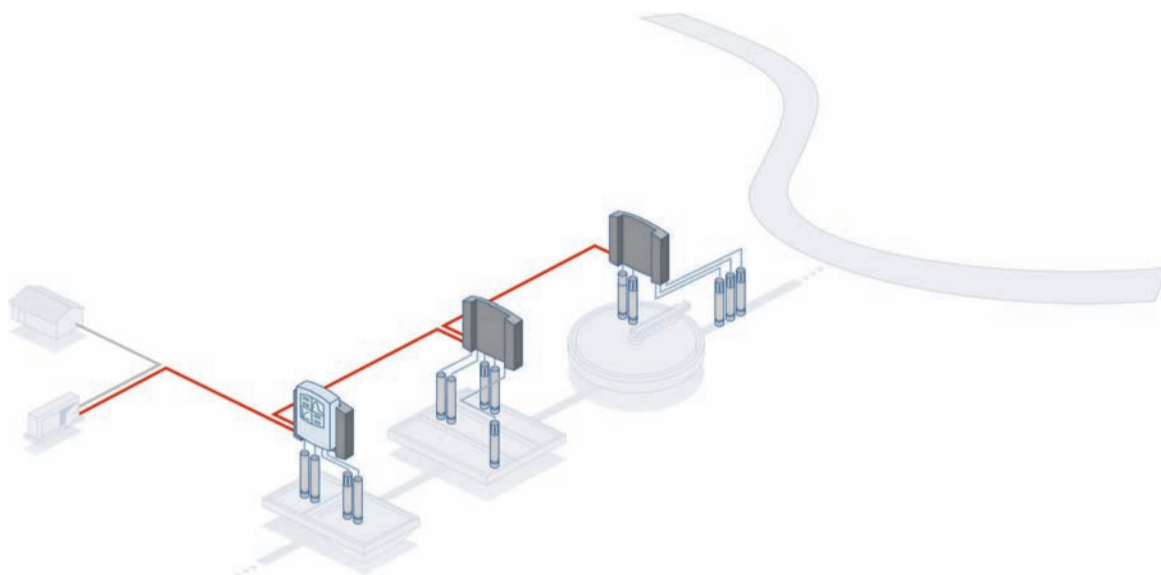


Figure 3: SC1000 in a network

The SC100 Controller (Figure 1) can be used with up to two sensors simultaneously for any combination of parameters, e.g. oxygen and solids concentration in the activated sludge stage of a sewage treatment plant. It is ideal for carrying out decentral metering tasks or simple minor automation tasks, such as controlling an intermittently operated denitrification (two-position controller with hysteresis and timer control). The SC100 saves the measured values of the connected sensors at freely programmable intervals over a period of months, and also saves all calibration data and alarm messages.

The SC1000 Controller (Figure 2) consists of a display module and a probe module. As a traditional controller it can handle up to eight different sensors in parallel. On site, the large colour display screen shows data or time/concentration graphs from four sensors simultaneously and switches to other displays at a touch. Expansion cards integrate the signals from other measuring instruments into the system. The calculation functions (basic methods of calculation, exponentiation, extracting roots, logic operations) can be used, for example, to calculate the ammonium and nitrate loads in the outflow of a sewage treatment plant with the help of an external flow signal. The pump status and any collection malfunctions can be recorded via digital inputs.

Data can be transferred reliably by GSM and remote operation through the optional built-in data telephone. Event messages arrive by SMS and email. Configuration,

data transmission from storage (measured values and results), uploading of new software and error diagnosis can all be carried out remotely.

In a network (Figure 3), the SC1000 can be expanded by additional probe modules if necessary. At each measurement station, one SC1000 probe module handles up to eight digital sensors simultaneously. And as soon as the portable display module has been placed on a probe module, all the sensors in the network can be operated. A portable display module shows the data of all sensors in the network as measured values and graphics. The network can be connected to a field bus system through an appropriate plug-in card in a probe module.

Summary

Digital sensors connected to standard controllers simplify the installation and operation of process measurement technology and cut investment costs, as far fewer controllers are needed. Entry into this "digital world" is simplified by analogue input cards, which can be used to integrate existing measuring instruments. No matter how the demands on the plant technology change, the system can simply be expanded to encompass new parameters and measuring stations. Your investment is therefore future-safe.